

Listing of Claims:

1. (currently amended) A system for temperature control of a
10 nucleic-acid probe substrate, which controls the temperature to the
substrate surface of which a plurality of nucleic-acid probes containing
single-stranded nucleic acid fragments having a complementary
sequence in respect to a target DNA have been immobilized in order
that the target DNA contained in a specimen is detected according to
15 hybridization; the system comprising:

a heat conduction ~~means~~ member comprising a heat-conductive
material disposed on the back of the substrate to the substrate surface
of which the plurality of single-stranded nucleic acid fragments have
been immobilized, and in contact with the back of the substrate;

20 a ~~heating means or cooling means~~ heater or cooler which is
provided in contact with the heat-conductive material; and

a ~~means~~ controller for controlling the amount of heat flowing
across the ~~heating means or cooling means~~ heater or cooler and the
heat-conductive material, to control the temperature of the
heat-conductive material;

25 the temperature of the substrate disposed in contact being
controlled through the temperature control of the heat-conductive
material.

2. (currently amended) A system for temperature control of a nucleic-acid probe substrate, which controls the temperature of a

10 substrate to the substrate surface of which a plurality of nucleic-acid probes containing single-stranded nucleic acid fragments having a complementary sequence in respect to a target DNA have been immobilized in order that the target DNA contained in a specimen is detected according to hybridization; the system comprising:

15 a heat conduction ~~means~~ member comprising a heat-conductive material disposed on the surface of the substrate to the substrate surface of which the plurality of single-stranded nucleic acid fragments have been immobilized, facing, and in contact with, the substrate surface, partly leaving a space for feeding the specimen thereinto;

20 a ~~heating means or cooling means~~ heater or a cooler which is provided in contact with the heat-conductive material; and a ~~means~~ controller for controlling the amount of heat flowing across the ~~heating means or cooling means~~ heater or cooler and the heat-conductive material to control the temperature of the

25 heat-conductive material;

the specimen fed into the space and the substrate surface, which are in contact with the heat-conductive material, being temperature-controlled through the temperature control of the heat-conductive material.

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3. (currently amended) The system according to claim 1 or 2,
wherein said heat-conductive material is formed of any one of a metal
10 and a resin or a composite of these two or more.

4. (currently amended) A method for detecting genes by utilizing
as a detection means a substrate to the substrate surface of which a
plurality of nucleic-acid probes containing single-stranded nucleic acid
15 fragments having a complementary sequence in respect to a target DNA
have been immobilized in order that the target DNA contained in a
specimen is detected according to hybridization; the method
comprising:

disposing a heat-conductive material on the back of the substrate
20 to the substrate surface of which the plurality of single-stranded nucleic
acid fragments have been immobilized, and in contact with the back of
the substrate;

disposing a ~~heating means or cooling means~~ heater or a cooler in
contact with the heat-conductive material; and
25 providing a temperature ~~control means~~ controller for controlling
the amount of heat flowing across the ~~heating means or cooling means~~
heater or cooler and the heat-conductive material to control the
temperature of the heat-conductive material;

the detection being operated while the substrate standing bonded
30 sandwichedly and the specimen standing in contact with the substrate

surface are temperature-controlled through the temperature control of the heat-conductive material by the temperature ~~control means~~
10 controller during the operation of gene detection.

5. (currently amended) The method according to claim 4,
wherein, in a plurality of steps involved in the gene detection operation,
said substrate and said specimen standing in contact with the substrate
15 surface are temperature-controlled; and
the temperature in the plurality of steps requiring temperature
control is successively controlled by the temperature ~~control means~~
controller which utilizes said ~~heating means~~ heater.

20 6. (currently amended) The method according to claim 4,
wherein, in a plurality of steps involved in the gene detection operation,
said substrate and said specimen standing in contact with the substrate
surface are temperature-controlled; and
the temperature in the plurality of steps requiring temperature
25 control is successively controlled by the temperature ~~control means~~
controller which utilizes said ~~cooling means~~ cooler.

7. (original) The method according to claim 4, wherein, as said
heat-conductive material, which is utilized for the temperature control
30 the substrate and of the specimen standing in contact with the

substrate surface, a heat-conductive material is used which is formed of any one of a metal and a resin or a composite of these two or more.

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8. (currently amended) A method for detecting genes by utilizing as a ~~detection means~~ detector a substrate to the substrate surface of which a plurality of nucleic-acid probes containing single-stranded nucleic acid fragments having a complementary sequence in respect to 15 a target DNA have been immobilized in order that the target DNA contained in a specimen is detected according to hybridization; the method comprising:

disposing a heat-conductive material on the surface of the substrate to the substrate surface of which the plurality of 20 single-stranded nucleic acid fragments have been immobilized, facing, and in contact with, the substrate surface, partly leaving a space for feeding the specimen thereinto;

disposing a ~~heating means or cooling means~~ heater or a cooler in contact with the heat-conductive material; and 25 providing a temperature ~~control means~~ controller for controlling the amount of heat flowing across the heating means or cooling means and the heat-conductive material to control the temperature of the heat-conductive material;

the detection being operated while the specimen fed into the 30 space and the substrate surface, which are in contact with the

heat-conductive material, being temperature-controlled through the temperature control of the heat-conductive material by the temperature 10 ~~control means controller~~ during the operation of gene detection.

9. (currently amended) The method according to claim 8, wherein, in a plurality of steps involved in the gene detection operation, said substrate and said specimen standing in contact with the substrate 15 surface are temperature-controlled; and the temperature in the plurality of steps requiring temperature control is successively controlled by the temperature ~~control means controller~~ which utilizes said ~~heating means heater~~.

20 10. (currently amended) The method according to claim 8, wherein, in a plurality of steps involved in the gene detection operation, said substrate and said specimen standing in contact with the substrate surface are temperature-controlled; and the temperature in the plurality of steps requiring temperature 25 control is successively controlled by the temperature ~~control means controller~~ which utilizes said ~~cooling means cooler~~.

11. (original) The method according to claim 8, wherein, as said heat-conductive material, which is utilized for the temperature control 30 of the substrate and the specimen standing in contact with the

substrate surface, a heat-conductive material is used which is formed of any one of a metal and a resin or a composite of these two or more.

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12. (currently amended) A probe substrate temperature control system for controlling the temperature of a probe substrate to the substrate surface of which a plurality of probes bindable specifically to a target substance have been immobilized in order to detect the target 15 substance; the system comprising:

a heat conduction ~~means~~ member comprising a heat-conductive material disposed on the side opposite to the surface of the probe substrate to which surface the detecting target substance have been immobilized, and in contact with the back of the substrate;

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~~a heating means or cooling means~~ heater or cooler which is provided in contact with the heat-conductive material; and

~~a means~~ temperature controller for controlling the amount of heat flowing across the ~~heating means or cooling means~~ heater or cooler and the heat-conductive material to control the temperature of the

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heat-conductive material;

the temperature of the substrate disposed in contact being controlled through the temperature control of the heat-conductive material.

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13. (original) A probe substrate comprising:

a substrate;

a plurality of probes bindable specifically to a target substance

10 which have been immobilized to the substrate surface; and

a heat-conductive material for controlling the temperature of the substrate; the material being disposed in contact with the back of the substrate.

15 14. (currently amended) A probe substrate temperature control system for controlling the temperature of a probe substrate to the substrate surface of which a plurality of probes bindable specifically to a target substance have been immobilized in order to detect the target substance; the system comprising:

20 a heat conduction ~~means member~~ comprising a heat-conductive material disposed on the surface of the substrate to the substrate surface of which the plurality of probes have been immobilized, facing, and in contact with, the substrate surface, partly leaving a space for feeding the specimen thereinto;

25 a ~~heating means or cooling means~~ heater or cooler which is provided in contact with the heat-conductive material; and

a ~~means~~ temperature controller for controlling the amount of heat flowing across the ~~heating means or cooling means~~ heater or cooler and the heat-conductive material to control the temperature of the

30 heat-conductive material;

the temperature of the substrate disposed in contact being
controlled through the temperature control of the heat-conductive
10 material.

15. (original) A probe substrate comprising:
a substrate;
a plurality of probes bindable specifically to a target substance
15 which have been immobilized to the substrate surface; and
a heat-conductive material for controlling the temperature of the
substrate; the material being
disposed on the surface of the substrate to the substrate surface of
which the plurality of probes have been immobilized, facing, and in
20 contact with, the substrate surface, partly leaving a space for feeding
the specimen thereinto.

16. (new) The system according to claim 2, wherein said
heat-conductive material is formed of any one of a metal and a resin or
25 a composite of these two or more.